

Remarks

The Examiner had rejected the previous claims under 35 U.S.C. § 103(a) as unpatentable over Pu et al. U.S. Patent No. 6,825,618 in view of Breka U.S. Patent Publication No. 2001/0022158, some further in view of Davis et al. U.S. Patent No. 6,685,799, and others still further in view of Todorov et al. U.S. Patent Publication No. 2003/0006009.

With the new claims, Applicants has rearranged the elements and expanded on the relationships between the elements and the functions of the subject matter in a way that should make it easier to appreciate novelty and unobviousness of the claimed invention.

It is recognized that, in semiconductor processing and related technologies, everyone seeks to achieve uniformity of the process at the wafer level. In plasma processing, almost everyone seeks to achieve process uniformity on the wafer with a plasma source that produces uniform plasma. Applicants takes a course that is different, by providing a peripheral ionization source that produces a plasma having an annular, alternating, high and low power distribution. Applicant does this by providing the source with a segmented configuration of alternating high-radiation and low-radiation segments arranged in a ring and positioned to couple power through a dielectric chamber wall into the chamber. No prior art reference seeks to achieve this.

More particularly, Applicants peripheral ionization source includes an RF antenna on the atmospheric side of a dielectric chamber wall and a shield on the vacuum side of the dielectric chamber wall. The shield has alternating high-transparency and low-transparency sections

arranged in a ring and positioned relative to the antenna to facilitate the coupling of RF energy from the antenna through the dielectric chamber wall and the shield and into the chamber in the annular, alternating, high and low power distribution. The high-radiation segments include the high-transparency sections of the shield and the low-radiation segments include the low-transparency sections of the shield.

More specifically, the high-transparency sections of the shield each have a plurality of slots therethrough that are oriented relative to the antenna to facilitate inductive coupling through the high-transparency shield sections. The low-transparency sections of the shield are electrically conductive and substantially more solid than the high-transparency sections to impede inductive coupling through the low-transparency sections of the shield.

No combination of references provides a sectioned shield that contributes to a segmented configuration in a peripheral source having alternating high-radiation and low-radiation segments arranged in a ring and designed to produce an annular, alternating, high and low power distribution plasma. To produce a plasma with such a power distribution would do what the references seek to avoid, thereby deterring those in the art from combining and modifying references in such a way.

Applicants also include, by way of dependent claims, antennas having segmented configurations that include high-efficiency sections that provide concentrated antenna current paths close to the dielectric chamber wall and low-efficiency sections that provide distributed antenna current paths. This produces stronger magnetic fields adjacent the high-efficiency sections of the conductor and weaker magnetic fields adjacent the low-efficiency sections of the conductor. By aligning the high-efficiency sections of the antenna with the high-

transparency sections of the shield, the high-radiation and low-radiation segments of the peripheral ionization source are produced in an effective way.

It is submitted that the claims, as amended are patentable. Accordingly, allowance is respectfully requested.

If any further charges are necessary, please apply them to Deposit Account 23-3000.

Respectfully submitted,

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